

**AMENDMENTS TO THE SPECIFICATION**

**Page 1, please amend the paragraph bridging pages 1 and 2 to read as follows:**

For this field of application, the need is more and more felt of ~~realising~~realizing isothermal reactors with a good yield and reliability, which are also of simple construction with low investment and maintenance costs. These features must, however, be compatible with a capability of operating with low pressure drops, low energy consumption and high heat exchange efficiency between the reactants and the cooling or heating fluid.

**Page 3, please amend the paragraph bridging pages 3 and 4 to read as follows:**

In DE-A-3 318 098, the helicoidal tubes in contact with the gaseous reactants at low temperature are subjected to a low thermal load, which implies a low degree of ~~vaporisation~~vaporization for the water thus producing low water outflow speed and hence high flow rates, in terms of mass. On the contrary, the helicoidal tubes in contact with the high temperature gaseous reactants are subjected to a high thermal load, which implies a high degree of ~~vaporisation~~vaporization for the water and ensuing high water outflow speed and hence low flow rates, in terms of mass.

**Page 4, please amend the first and second first full paragraphs to read as follows:**

Therefore, when the reactor is operating, a situation occurs in which the helical tubes subjected to a high thermal load are those fed with less water and tend therefore to have an ever increasing degree of ~~vaporisation~~vaporization and an ever decreasing capability of heat removal. This implies a far from optimum temperature distribution inside the catalytic bed in case of

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moderately exothermic reactions as the methanol synthesis, whereas in case of fast and strongly exothermic reactions such as the formaldehyde synthesis it may even bring to temperature overshoots.

Furthermore, the excessive ~~vaporisation~~ vaporization enhances the formation inside the tubes of deposits of residues present in the water, thus affecting their heat exchange efficiency. All these disadvantages are independent from the fact that the tubes are arranged at a more or less close distance between each other according to the temperature profile of the gaseous reactants inside the catalytic bed.

**Page 5, please amend the fourth full paragraph to read as follows:**

The technical problem underlying the present invention is that of providing an isothermal or pseudo-isothermal reactor for carrying out exothermic or endothermic heterogeneous reactions, which has structural and functional features such to allow a simple and reliable ~~realisation~~ realization, that requires low investment and maintenance costs and allows operating with low mechanical loads on the internals and with a high heat exchange efficiency between the reactants and the cooling or heating fluid.

**Page 6, please amend the second and third paragraph to read as follows:**

On the basis of such resolute idea, the technical problem is solved, according to the invention, by a reactor of the previously indicated type and ~~characterised~~ characterized in that the heat exchanger comprises a plurality of superimposed and structurally independent modular units, each of them including at least two tubes formed as a spiral, a coil or alike provided

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transversally to the axis of the shell and wrapping around a corresponding portion of said inner side wall of said catalytic bed, and provided with respective connecting portions to said feed and discharge collectors.

Thanks to the present invention, it is possible to ~~realise~~realize, in a simple and effective way, an isothermal or pseudo-isothermal reactor with a high heat exchange coefficient, to all advantage of the conversion yield and of the energy consumption.

**Page 7, please amend the third full paragraph to read as follows:**

Finally, it shall be noted that the reactor according to the present invention is particularly simple to ~~realise~~realize and does not require using tube plates with ensuing relevant savings in terms of investment and maintenance costs.

**Page 8, in the Detailed Description please amend the first full paragraph to read as follows:**

With reference to such figures, an isothermal or pseudo-isothermal reactor ~~realised~~realized according to the present invention for carrying out exothermic and endothermic heterogeneous reactions is referred to in its whole and schematically with numeral 1.

**please amend the paragraph bridging pages 8 and 9 to read as follows:**

A closing cover ~~36~~46 (figure 5) is foreseen for closing the entrance of the shell 2 at the end of the construction phase at site that foresees the assembly and/or loading of the catalyst.

**Page 9, please amend the second full paragraph to read as follows:**

The cylindrical walls for containing the catalyst may be ~~realised~~realized with different known constructive solutions consisting for example of walls, which are punched, perforated, covered with metallic mesh or of simply perforated sheets.

**Page 11, please amend the fourth full paragraph to read as follows:**

For example, a spiral tube may be ~~realised~~realized with a constant winding pitch, that is to say an equal distance between the various turns along the complete spiral. Anyway, particularly advantageous results have been obtained by varying the winding pitch according to the variation of the radius of the spiral, so to adapt it to the temperature profile of the gaseous reactants inside the catalytic bed 3, following all its thermal variations.

**Page 12, please amend the fifth paragraph to read as follows:**

The cooling or heating fluid is supplied to the tubes 15 through the feed collector 14 which is in fluid communication with one ~~o~~or more of the inlet nozzles 18. The same fluid is extracted from the tube 15 through the discharge collector 16 that is in fluid communication with one or more of the outlet nozzles 19.

**Page 17, please amend the second and third full paragraphs to read as follows:**

It shall be noted that the resulting structure is very simple to ~~realise~~realize with ensuing savings in terms of maintenance and investment costs with respect to the solutions of the prior art.

The embodiment shown in figure 5 is particularly advantageous in that having the tubes 15, all connected to each other, the resulting structure is particularly simple to be ~~realised~~

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realized as it needs only one feed collector 14 and one withdrawal collector 16 for the cooling or heating fluid.

**Page 18, please amend the paragraph bridging pages 18 and 19 to read as follows:**

From the presentation above, the numerous advantages achieved by the present invention arise clearly, in particular the provision of a reactor for carrying out exothermic or endothermic reactions of simple ~~realisation~~realization, reliable and at low investment and maintenance costs, that at the same time allows operating with a high conversion yield, low pressure drops, low energy consumption and with a high heat exchange efficiency between the gaseous reactants and the cooling or heating fluid.

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**Please delete the present Abstract of the Disclosure and add the following new**

**Abstract of the Disclosure found on the attached unnumbered sheet:**